Ontology in Performance Evaluation

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The criteria for measurement of performance of intelligent systems allow a qualitative comparison of one system against another. The performance measurement allows us not only to judge the achieved level of success or failure, but also to evaluate cost effectiveness of a particular design. However, the performance criteria alone is not sufficient to give an objective evaluation of the system. A thorough approach requires the consideration of methods and devices for performance evaluation. The need for this thorough approach requires us to take a look at the ontology of performance of intelligent systems.

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Before we attempt to define methods of performance measurements we need to reexamine what are the distinctive elements which make a system intelligent and how do they relate to each other. These elements require scrutiny individually and as whole [1] as well as the mechanisms, by means of which they interact.

The questions that are worthwhile to examine are those that reflect processes at a particular level of system functioning associated with organizational echelons. An intelligent system is goal driven. The goals are both internal and external. The system has to be able to decompose goals into subgoals giving an emergence of hierarchy of goals. The system representation, also hierarchical, plays an important part in developing the ontology and requires a distinct attention [3].

Another tempting aspect for discussion is the topic of ontology of self-referentiality of intelligent system [2]. Particularly considering the new and different ways in which intelligent systems conceptually forms and specifies representation of objects as a particular manifestation of self-referentiality. That indeed requires special attention when formulating ontology.

A few question arise as we ponder the meaning of the role of ontology in performance evaluation:

1. What is the purpose of ontology and how does it helps us to find the answers we are looking for?
2. What are the framework, development methodologies and life-cycle maintenance?
3. Can it provide an objective representation of performance and associative measurement devices and methodologies?
4. Should the ontology reflect the system functioning and collaboration with other systems?
5. An intelligent system has a user who interacts with it. A user maybe another system or a human. Does that mean that we need two ontologies, one for the user and the other for a system under evaluation?
6. And finally when we are addressing complex systems, and an intelligent system is a complex system, should we not consider ontologies of many hierarchical levels [3]?

References:

1. John H. Holland, "Emergence: From Chaos to Order", Helix Books
2. Roger Penrose, "Shadows of the Mind", Oxford university press, 1994
3. Alexander Meystel, James Albus, " Intelligent Systems: Architecture, Design and Control, Wiley, NY, 2002.